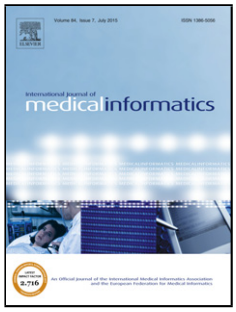

Title: Delivering healthcare at a distance: Exploring the organisation of calls to a health helpline

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Title: Delivering healthcare at a distance: Exploring the organisation of calls to a health helpline.

Short title: Organisation of health helpline calls.

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Highlights:

- *Healthdirect Australia* calls are highly structured, involving 8 phases.
- Helpline encounters differ in many ways to primary care consultations.
- Challenges to interaction can be overcome through specialized call-taker training.
- Improved helpline system design could avoid challenges and enhance call flow.

Abstract:

Background: Health helplines are integral to contemporary healthcare, offering fast, low-cost, and geographically unrestricted access to health information and advice. Although some health helplines offer support services (e.g., counselling), many function in ways that are similar to physically co-present (i.e., face-to-face) primary care consultations. However, due to the lack of physical presence, there are differences in the way health consultations are routinely managed on the telephone. This article explores some ways in which healthcare is managed at a distance, on a telephone helpline.

Methods: Data are 196 recorded calls from the helpline, *Healthdirect Australia*. Using conversation analysis, this paper compares the delivery of healthcare over the telephone with what is known about physically co-present primary care consultations.

Results: Through an exploration of the overall structure of these helpline calls, we show how *Healthdirect Australia* calls are organised in terms of eight distinct phases: call opening, establishment of reason-for-calling, check of caller safety, creation of a confidential patient file, medical information-gathering, health advice, caller survey questions, and call closing. We demonstrate how interactants organise their talk around these phases, with a particular focus on the shift between mandated administrative tasks and traditional medical tasks.

Conclusions: Findings from this study suggest that there are systematic differences between the overall structure of health helplines and physically co-present primary care consultations. We

demonstrate that the delivery of health information and advice via helplines can be challenging, but that service can be enhanced through continued efforts to inform understanding about how medical encounters routinely unfold in over-the-phone environments.

Keywords: Health communication; Telehealth; Helplines; Qualitative.

1. Introduction

Telehealth services are an important aspect of contemporary healthcare, with use rising steadily in recent years (Baker, Emmison & Firth, 2005; Sabesan & Kelly, 2015). Health helplines are particularly popular because of the fast, low-cost, and, typically, anonymous access to health information and advice that they provide. They also offer a means of addressing overcrowding in hospital emergency departments, a global problem that has negative consequences for quality of care, efficiency and the economy (Rooney & Schilling, 2014). In particular, health helplines are argued to reduce the number of patients presenting to emergency departments with non-urgent medical conditions (Jensen & Crane, 2014). Despite their putative utility, there is little existing evidence about the moment-by-moment delivery of healthcare on health helplines. Given that helpline use is increasing, there is a need to understand how these alternative healthcare interactions are structured. Examining the nature of interaction between callers and call-takers on health helplines can shed light on how healthcare can be successfully delivered at a distance, as well as exposing routine challenges in service delivery.

Specialised health helplines offer similar services to primary care consultations, for example: triage, physical assessment, and treatment recommendations. However, helplines differ from physically co-present (i.e., face-to-face) primary care services, with which most people have become acquainted throughout a lifetime of use (Roberts, Sarangi & Moss, 2004). One challenge to

achieving successful communication on such helplines is callers may not be familiar with the specific type of service provided. Callers to helplines may be confused, for instance, by the need for call-takers to complete administrative activities in conjunction with their primary care duties. It has been noted, for example, that the inclusion of ethnic-monitoring questions may be perceived as inappropriate by callers and result in resistance to non-health-related activities (Leydon et al., 2013). In order to accomplish both medical and non-health-related activities successfully, callers and call-takers must manage their interactions in ways that address the challenges of delivering healthcare at a distance.

1.2 Exploring healthcare communication

Although previous research has studied health helpline use, most work has relied on quantitative surveys or retrospective accounts to generate data (e.g., Lechner & De Vries, 1996; Fakhoury, Wright & Wallace, 2001; Goode et al., 2004; Murdoch et al, 2015). Such studies offer little insight into the nature of actual interaction on health helplines . Recordings of naturally occurring interactions (i.e., those produced in the absence of a researcher) are ideal for studying helpline interaction, as the production, negotiation and maintenance of these interactions is, in itself, the 'help' that is provided (Baker, Emmison & Firth, 2005).

Conversation analysis (CA) is a method for investigating naturally occurring social interaction that focuses on how particular communicative practices are designed to suit preceding contributions to that interaction, and in turn, shape what follows. CA is frequently used to analyse healthcare interaction (Drew, Chatwin & Collins, 2001; Heritage & Maynard, 2006). One contribution of CA has involved identifying how such interactions are routinely organised into recognisable phases (Ten Have, 1995; Heritage & Stivers, 1999; Robinson, 2003; Heritage & Robinson, 2006b; Boyd & Heritage, 2006), and how participants routinely design their interactions to adhere to these phases. The routine phases of health encounters, therefore, have an impact on how interactants behave at particular points in the interaction. Byrne & Long (1976) introduced the concept of functionally

oriented-to 'phases' in primary care, describing consultations as involving: 1) an opening, 2) the establishment of a medical complaint by the patient, 3) an examination of the patient, 4) a problem diagnosis, 5) treatment recommendations, and 6) a closing. Subsequent research has continued to investigate overall structural organization of primary care encounters (Robinson, 2003), as well as exploring interactional patterns that occur during particular medical phases, such as the delivery of good or bad news during diagnosis (Maynard & Frankel, 2006), patient responses to treatment recommendations (Stivers, 2005) and aspects of terminating medical visits (West, 2006). Overall structural organization has also been explored in other health-related contexts, including specialist medical appointments (Henry et al., 2013) and child mental-health consultations (O'Reilly, Karim, Stafford & Hutchby, 2014). Although there is now considerable detailed knowledge about how healthcare is delivered in settings where the participants share physical proximity, less is known about delivery of healthcare at a distance, such as via telephone helplines. Given the impact of oriented-to phases in primary care encounters, it is important to explore this fundamental aspect of health helplines, as well as exploring how interactants display their expectations of how they should behave during the healthcare encounter, and how these expectations are managed within the interaction.

Due to lack of physical proximity on health helplines, it is unclear whether findings from CA studies of physically co-present healthcare encounters can be applied to this context (Arminen, Licoppe & Spagnolli, 2016). Most health helplines that have been studied to date have been concerned with provision of information and support rather than with medical advice and triage to medical services (e.g., cancer information helplines, Leydon, Ekberg, Kelly & Drew, 2013; pregnancy information helplines, Shaw & Kitzinger, 2007; and telephone counselling services, Feo & LeCouteur, 2013; Danby & Emmison, 2014). The small number of studies that have described triage-focussed helplines have focussed on specific aspects of service delivery, such as the provision of recommendations (Pooler, 2010), call-takers' use of computer-directed software (Murdoch et al., 2015), and the types of callers who use health helplines (Goode et al., 2004).

Further, the question of how helpline interactions are managed to accomplish the dual tasks of providing medical assistance and mandated administration has yet to be investigated.

Our aim in this paper is to explore how healthcare is delivered over the telephone, examining how it unfolds, and comparing findings with what previous research has identified in physically co-present primary care. This analysis will include examining how the overall structure of helpline interaction compares to Byrne & Long's (1976) seminal descriptions of physically co-present primary care consultations. Understanding how healthcare is delivered at a distance, using helplines, has important implications for both health-service providers and consumers. Given that helplines have potential to reduce the burden on physical services, such as hospital emergency departments, it is important to understand how helplines efficiently and effectively fulfil their purpose. Understanding more about health helpline interaction will assist with their design, and with operator training. Identifying evidence of gaps between what callers expect and what a service provides is also beneficial for service delivery. It is also important that telehealth researchers (as well as service providers) understand the overall structure of health helplines, as well as how callers and call-takers negotiate oriented-to phases while delivering/ receiving healthcare at a distance.

2. Data and method

Data for this study were collected from *Healthdirect Australia* (hereafter *Healthdirect*), a health-information helpline service funded by the Australian Government. Call-takers are registered nurses who use computer decision-support software (CDSS) to perform assessments of callers' symptoms and provide treatment advice. The CDSS provides call-takers with symptom-based, age-specific algorithms that assist in providing recommendations regarding appropriate levels of care. Although CDSS guides the topics of call-takers' questioning, their turns are not premeditated or scripted. However, call-takers are required to design their talk in accordance with *Healthdirect's* institutional policies, including the requirement that call-takers do not provide over-the-phone diagnosis of medical conditions - only health advice and information are permitted.

The data were 196 telephone calls, involving just over 35.5 hours of audio recording, collected between 2010 and 2012. Calls ranged in length from 1:48 to 23:06 minutes, with an average duration of 9 minutes. Due to a previously negotiated agreement between SA Health and the Freemasons Foundation Centre for Men's Health at the University of Adelaide (which granted researchers access to the calls), all calls in the corpus were from men, with the exception of 20 calls where a woman initiated contact, but eventually passed the telephone to a male patient.

Ethics approval for the study was provided by the Human Research Ethics Subcommittee of the School of Psychology at the University of Adelaide. Written consent was obtained from call-takers, and verbal consent from callers. All personal information was omitted or replaced with pseudonyms during transcription to protect participant anonymity.

A conversation analytic approach (Sacks, Schegloff & Jefferson, 1974; Sidnell & Stivers, 2012) was used to explore how calls to *Healthdirect* naturally unfolded. CA allows for exploration of the organisation of talk, as well as highlighting systematic patterns of interaction that might otherwise go unnoticed. Institutional encounters (such as medical visits) tend to exhibit a highly structured organisation, meaning that talk takes on a certain shape due to adherence to particular phases (Heritage & Maynard, 2006). Exploring this organisation is a fundamental task of conversation analytic studies of institutional interaction (Heritage, 2004). Identification of the oriented-to phases of health helpline calls is necessary in order to understand the systematic features of these alternative health encounters. This paper deals primarily with the overall structural organisation of *Healthdirect* calls, with analyses of specific call characteristics forthcoming in future papers.

Although CA is most often used for fine-grained analysis of specific features of talk, its use here is appropriate to our aim of revealing the *in situ* management of health helpline calls, comparing these findings with what is known about the structure of physically co-present health encounters. Consistent with the CA approach, calls were transcribed using the system developed by Jefferson (2004; glossary of conventions in Appendix 1).

3. Analysis

Although there was minor diversity in the way *Healthdirect* calls were managed, a general level of organisation was recurrent across calls. Although comprehensive analysis is beyond the scope of a single paper, we focus here on the most common aspects of these calls. In what follows, we describe the organisation of *Healthdirect* calls in terms of eight distinct phases: (1) call opening, (2) establishment of reason-for-calling, (3) check of caller safety, (4) creation of a confidential patient file, (5) medical information-gathering, (6) health advice, (7) caller survey questions, and (8) call closing.

A number of differences were evident in the way *Healthdirect* calls were negotiated when compared to previous findings on physically co-present primary care consultations. Although calls involved medical phases similar to those described by Byrne & Long (1976), the management of medical activities differed in various ways. Furthermore, in most cases, health helpline interaction involved delivery of health advice about treatment, rather than provision of a diagnosis.

In what follows, we outline the interactional processes involved in various phases of *Healthdirect* calls comparing, in each case, with what is known about interaction in primary care consultations.

3.1 Call openings

Previous research has described how, in primary care consultations, clinicians typically open the visit by attempting to establish an 'interactional relationship' with patients before the first topic of talk is initiated, usually through an exchange of greetings and personal-state inquiries (Byrne & Long, 1976; Heritage & Robinson, 2006b). This order of initial encounters, termed a 'how-are-you' (HAY) sequence, has also been reported in mundane (i.e., 'everyday') telephone interaction where reciprocal greetings and personal-state inquiries precede the first substantial topic of discussion (Sacks, 1992). Previous CA research has found that HAY sequences are sometimes absent from institutional telephone interaction (Watkin & Zimmerman, 1999). As can be seen in the two extracts below, *Healthdirect* call-takers' institutional call openings (indicated with →) were typically

expressed in the form of three elements: institutional identification, personal identification, and an offer to assist.

Extract 1: Call 7

```
1 → Call-Taker:  Heal:thdirect Australia this is Kal how can I help?
2   Caller:      Um ye:s my hus:band: <has> got a big graze  on his le:g
```

Extract 2: Call 10

```
1 → Call-Taker:  Healthdirect Australia this is N:at how can I help you?
2   Caller:      hH:ey my name's Carl how are you this morning?
3   Call-Taker:  I'm goo:d and you?
4                (0.6)
5   Caller:      hhhTroubled
```

Following call-takers' three-part opening turns, callers' routinely responded in one of two ways: (a) with a HAY sequence followed by a problem-presentation, or b) with a problem-presentation (i.e., skipping the HAY sequence). Opening sequences were therefore short, with callers typically transitioning quickly into the next phase of the call: providing a reason-for-calling.

3.2 Reason for calling (RFC)

In primary care consultations, health professionals often take the role of eliciting a reason for attending from patients, using questions like, "What can I do for you today?" (Bates, Bickley, & Hoekelman, 1995; Heritage & Robinson, 2006a). In *Healthdirect* calls, this action was accomplished within the call-takers' initial turn through an offer of assistance, that was routinely treated by callers as soliciting their RFC.

The presentation of medical concerns in physically co-present primary care has been described as involving problems that are either 'known' (involving previously experienced medical conditions) or 'unknown' to patients (Heritage & Robinson, 2006a). In *Healthdirect* calls, RFC presentations were also designed in ways that distinguished between known and unknown medical problems. This pattern can be observed in the following two extracts, which feature the presentation of an RFC that is known (Extract 3) and unknown (Extract 4).

Extract 3: Call 13

1	Call-Taker:	Healthdirect Australia Teresa speaking how
2		>can I< help y:ou
3 →	Caller:	YeaH: HI um (.) I trod on a rusty n:ail this
4		morn:ing an(d) I wasn't sure whether it penetrated
5		my foot<I've just taken my sock off and it h::as
6		(0.4)
7	Call-Taker:	Yep
8	Caller:	Ah::mm:: would it- would it be okay to go down
9		an(d) get a tet:anus needle tomorrow?
10	Call-Taker:	Okay first of all ah:: is there any bleeding there now?

Extract 4: Call 23

1	Caller:	I've had a little problem with my:self
2	Call-Taker:	Ye:ah how can I help you
3 →	Caller:	Ah:: just before lunch today I was bleeding out of my
4		back passage
5	Call-Taker:	Yeah okay: are you still bleeding now?
6	Caller:	Um:: I was when I had a shower a couple hours ago
7	Call-Taker:	O:kay can I just ask are you having any trouble
8		brea:thing at the moment?

It was common for callers to present their RFC in a multi-unit narrative form with description of symptoms across a timeline. This multi-unit narrative form can be seen in Extracts 3 and 4, where both callers explain the circumstances around their presenting medical concerns. Although RFCs were designed differently based on whether they involved known or unknown problems, this distinction was not attended to by call-takers who, in each of the examples above, treat the completion of the caller's RFC as a space to transition into the safety check phase. This was the next activity across all calls in the data set.

The safety check phase was the first point in *Healthdirect* calls where there was an observable transition from medical talk to administrative talk. The transition to administrative talk here is a point of difference in terms of what is known about physically co-present consultations, where a problem-presentation would most likely be followed by history-taking or a physical examination (Byrne & Long, 1976).

3.3 Safety check

In physically co-present medical encounters, it is generally obvious from the outset if a patient is severely unwell or experiencing a medical emergency. Health professionals have access to a range of physical and visual cues, making formal safety checks unnecessary as a routine part of primary care (Byrne & Long, 1976). However, on health helplines, safety must be assessed verbally through a series of questions. Such questions are institutionally mandated, and as such, occurred in all calls in the corpus regardless of callers' health concerns. Due to the institutional requirement that safety checks be completed as soon as possible, call-takers routinely had to manage a transition away from talk about the caller's focal health issues (as introduced in the RFC) to a mandated task. Extract 5 illustrates the design of the safety check:

Extract 5: Call 163

```
1    Caller:       I'm just calling for my mum .hh and she just
2                  wants to know whether she can take Panadol
3                  with Tel:fast
4 → Call-Taker:    Ah okay I can certainly help with that quest:ion
5                  I just need to ask some safety questions<so your mum's
6                  not having any difficulty breathing at the moment?
7    Caller:       No: no
8    Call-Taker:   And she's not feeling f:aint or like passing out
9    Caller:       N::o
```

Safety checks involved asking a series of questions that assessed callers' vital signs, such as breathing and level of consciousness. Such questions typically took the form of negative declaratives, a formulation that anticipates a response confirming absence (rather than presence) of symptoms (Heritage, 2010). In Extract 5, the caller has requested over-the-counter-drug-interaction information – a request that carries a low likelihood of immediate medical risk. Nevertheless, the call-taker asks the mandatory safety questions around breathing and consciousness, formatted as negative declaratives through lines 5-8. Here, the safety check is described as "some safety questions" that "need" to be asked (line 5). This turn positions the safety check as a preliminary necessity, as opposed to something that is medically urgent. It was typical for call-takers to use institutional accounts (such as, "I just need to ask…") to manage transition into the safety check phase of calls. The use of institutional accounts to transition from medical talk (in the RFC phase)

to mandated talk suggests that call-takers anticipate that this transition may be unexpected. Such framing is understandable in the sense that a switch to administrative duties at this point in the health encounter contrasts with what patients experience in physically co-present consultations. Once call-takers were able to ascertain that a call did not involve an emergency, they typically transitioned into the second administrative phase of the call: establishment of a confidential patient file.

3.4 Confidential patient file

In most physically co-present healthcare encounters, the creation of a confidential patient file (involving name, date of birth, address) is managed by administrative staff, outside of interaction with a medical professional. On *Healthdirect*, calls are handled by a single call-taker who is responsible for creating files for new callers or retrieving previously created files. The confidential file contains caller details and medical history, and facilitates call-takers' communication with emergency services if required.

In the present corpus, most callers had not previously used the *Healthdirect* service. Extract 6 illustrates how call-takers routinely negotiated the activity of creating a confidential file by asking a series of questions relating to patient demographics.

Extract 6: Call 12

```
1 → Call-Taker:  Alright I just need to get a file open and get some
2                ba:sic details an' then I'll ask you some more questions
3                about what's going on there okay?
4    Caller:     Yep
5    Call-Taker: Alright have you phoned us before?
6    Caller:     No I haven't
7    Call-Taker: What's your first name?
8    Caller:     Ste:ven
9    Call-Taker: With a vee?
10   Caller:Yep  (.) ee v:ee ee en=
11   Call-Taker: =And ya last name?
12   Caller:     Lin:coln e:l eye en c:ee oh el en=
13   Call-Taker: =And your date of birth?
```

Call-takers tended to introduce the confidential-file sequence in a similar way to the safety check – as a preliminary necessity that needed to be completed. This format is evident in Extract 6 (lines 1-3). Here, the call-taker's use of a turn-initial "alright" signals a shift to a new task (Turner, 1999; Filipi & Wales, 2003), with the description that follows designed to manage the caller's expectations about what the confidential file will contain, and when his medical issues will be addressed.

Consistent with previous research (Leydon et al., 2013; Wilkinson, 2011), interactional difficulty was noted during the confidential-file sequence in a small number of calls where callers expressed confusion as to why such questions were necessary. An example of this trouble is illustrated below:

Extract 7: Call 129

```
1     Call-Taker: Steven:: what is the address there please?
2 →   Caller:     .hhh (0.3) Is this really important?=
3     Call-Taker: =Um yes because if you've used our service before: there
4                 may be a possible record here already that I just need to
5                 open up.
6     Caller:     Yep. (.) it's: six Bright Avenue
```

Extract 7 comes after the call-taker has requested the caller's address – a standard question in the confidential file phase. However, instead of providing his address, the caller audibly inhales and challenges the necessity of the question by asking, "Is this really important?" (line 2). In response to this request for clarification, the call-taker provides information about why the collection of this information is necessary (i.e., to locate the caller's pre-existing file). Apparently satisfied with this explanation, the caller provides his address and the confidential file continues without further trouble. Although comprehensive analysis of interactional difficulty in *Healthdirect* calls is not the focus of the current paper, evidence of such difficulty suggests that callers may not expect to provide demographic information in health helpline interactions and hence do not recognise such questions as necessary or relevant at this point in the call.

3.5 Medical information-gathering

Medical information-gathering routinely followed the confidential-file questions, and marked a shift from 'administrative' talk back into 'medical' talk. The content of call-takers' questions was determined by CDSS prompts which (like the safety check) function to rule out potentially severe medical conditions. During this phase, call-takers were prompted by CDSS to collect information about the caller's current health concern (Extract 8) and general medical history (Extract 9).

Extract 8: Call 16

```
1 → Call-Taker:  How long ago d(o)<ya notice the pain and the swelling
2                to your foot?
3                (0.2)
4    Caller:     Ah::: (f).hhh bout Mon-Mond:ay
```

Extract 9: Call 14

```
1 → Call-Taker:  You haven't had any surgery at all?
2                (0.4)
3    Caller:     Nah
4 → Call-Taker:  No:: and you've got no pa:in
5                (0.8)
6    Caller:     Na::h
```

Medical information-gathering was accomplished through a series of questions framed as either *wh*-questions (i.e., "what", "when", "why" and "how") or yes/ no interrogatives. An example of *wh*-question use is shown in Extract 8, where the call-taker asks a 'how'-prefaced question regarding the caller's current health concern (i.e., a swollen foot). The design of yes/ no interrogatives tended to anticipate a particular response, with positively framed questions anticipating confirmation, and negatively framed questions anticipating disconfirmation (Boyd & Heritage, 2006). This pattern is evident in Extract 9, where the negative framing of both call-taker questions (lines 1 and 4) anticipates the negative response (disconfirmation) from the caller in both instances.

Healthdirect call-takers also collected specific medical information by instructing callers to conduct physical self-assessments. Physical-assessment-by-proxy allowed call-takers access to information about callers' or third-party patients' (e.g., children's) physical state. By instructing callers, call-

takers were able to perform complex diagnostic work that would otherwise be performed by health professionals in physically co-present encounters. This feature is illustrated in the following extract, which involves a possible heart attack (Extract 10).

Extract 10: Call 47

```
1 → Call-Taker:  Okay mo:ve your arms about<lift your arms up and about
2                wave them around whatever you need to do Tom:: so that
3                you're moving them up above your chest again for me::
4                =does the pain get worse when you do that at all
5                (1.2)
6    Caller:     No
7    Call-Taker: Okay and do you feel any degree of shortness of breath
```

Medical information-gathering in physically co-present consultations occurs in a similar fashion to that observed in *Healthdirect* calls. Analysis of clinician-patient interaction also shows clinicians design their questions grammatically to prefer responses that confirm the absence of unfavourable health conditions. This pattern has been described as 'optimization', and is the default principle of medical questioning, as it functions to gather large amounts of information rapidly (Heritage, 2010). When clinicians share physical proximity with patients, medical information-gathering is often a combination of verbal questioning and physical examination (Byrne & Long, 1976; Stivers & Majid, 2007; Heritage, 2010). In contrast, information-gathering in *Healthdirect* calls was limited to verbal questioning and reporting. However, call-takers were afforded some physical information through verbally-reported caller self-tests by means of physical-examination-by-proxy (present authors, forthcoming).

In *Healthdirect* calls, the activity of medical information-gathering concluded when call-takers had collected sufficient information for the CDSS algorithm. Once adequate information was obtained, *Healthdirect* call-takers transitioned into another activity: the provision of health advice.

3.6 Health advice

Diagnosis is an expected element of primary care consultations, and is considered a central objective for health help-seeking (Byrne & Long, 1976; Robinson, 2003). However, *Healthdirect* call-takers are not authorized to offer diagnoses[1]. Operating within this institutional constraint, call-takers instead delivered health advice to callers as suggested courses of action in the majority of calls. These courses of action appear on call-takers' screens based on information collected in previous phases of CDSS-assisted questioning.

Five types of suggested action were used by call-takers in the corpus: (1) visit the hospital emergency department, (2) consult a General Practitioner (GP), (3) contact an after-hours GP service, (4) contact the poisons information helpline, or (5) manage the condition with home-based self-care. An example of a suggestion course of action involving a GP recommendation is shown in Extract 11.

Extract 11: Call 13

1 →	Call-Taker:	So what I would suggest you do: Carl is that<yes you do
2		need to see a doctor within the next twen(t)y four hou:rs
3		(0.3)
4	Caller:	R:ight
5	Call-Taker:	=And you must have a tetanus w- >ah< if you don't-
6		if you're not ah: (.) tet tox ah covered you need
7		one within seventy two hours from the time of the
8		puncture wou:nd
9	Caller:	Yeah
10	Call-Taker:	Okay? [Now:]
11	Caller:	[I'll] ring (first aid) in the morning yep
12		(0.5)
13	Call-Taker:	Erm: (.) where<erm: Renmark wha- d- do that- does that
14		have like medical centres? or er- is it only a nursing
15		post ( ) where you a:re or::
16	Caller:	Just a nursing post<well not even a nursing post it's
17		a St John's bu- they don't use it as a nursing post
18		(0.4)
19	Caller:	But we've got doctors down the hill
20	Call-Taker:	You have?
21	Caller:	Yep
22	Call-Taker:	=Okay y- you've got a doctor that you can go: to?
23	Caller:	Ye::ah I'll go see our normal doctor tomorrow or the
24		nurse out the back (.) whichever

[1] Provision of diagnoses is not generally a feature of health helplines, with similar helplines (e.g., *NHS Direct*) also operating within this framework (Pooler, 2010).

In this case, the call-taker suggests that the caller consult a doctor for a tetanus vaccination, and provides recommended timeframes for this course of action. Although the health advice is formulated as a suggestion at line 1, the call-taker persists in ensuring that the caller has the means to implement the suggestion (due to his rural location), until the caller makes it clear that he will see a doctor the next day (line 23). By delivering health advice as suggested courses of action, *Healthdirect* call-takers were routinely able to offer callers expert opinion on how to manage their health concerns without providing diagnoses.

Although call-takers are not authorized to provide diagnoses, there were some calls in which diagnoses were provided, nonetheless. In every case, this involved calls in which health problems were assessed as being appropriately manages with home-based care. This pattern is demonstrated in Extract 12, where a caller is inquiring about her daughter's gastrointestinal condition.

Extract 12: Call 31

```
1    Call-Taker:  So at this stage I think it- it's fi:ne to keep her at
2                 ho:me oka::y that she's quite safe to be kept at home
3 →               .hh and it sounds like she's got a bit of a (.) gas:tro
4                 sorta thing especially if she's had a bit of loose bowels
5                 as we:ll
6    Caller:      Yeah
```

In instances where call-takers did provide diagnoses, 'sounds like' formulations were regularly used to convey that claims were inferences based on a prior description (Ekberg et al., 2016). A 'sounds like' formulation is demonstrated in Extract 12, where it works to support the recommendation of home care. Despite not being institutionally authorized, it seems there are benefits to these types of qualified diagnoses, as they assist call-takers in delivering low-level care advice.

In all calls, the provision of health advice by call-takers, and callers' acknowledgement of this, generally signalled the end of substantive discussion. From here, transition was made back to administrative tasks through the initiation of a sequence of survey questions.

3.7 Caller survey questions

Caller survey questions on *Healthdirect* are designed to assist evaluation and institutional reporting about the service. Two questions are asked: a hypothetical 'what-would-you-have-done' question (Extract 13), and a caller-consent question (Extract 14).

Extract 13: Call 27

```
1 →   Call-Taker: Al:right and what would you have done if you didn't
2                 call us tonight?
3                 (0.4)
4     Caller:     A:::h probably would've toughed it out til the morning
```

Extract 14: Call 5

```
1 → Call-Taker:  May I ask you a question before you go:
2    Caller:     Sure yes
3 → Call-Taker:  W:e ran:domly survey our callers.
4                (.)
5     Call-Taker: If you <con:sent> infor:mation relating to this call will be
6                 provided to a third par:ty in order for us to improve ou:r
7                 services<is this okay with y:ou
8    Caller:     Ye::ah that's al:right
```

Call-takers tended to transition into the survey questions in ways similar to that evidenced in prior administrative tasks in calls (e.g., the confidential file task). Transition markers in turn-initial position, like "al:right" in Extract 13, were frequently used to signal a forthcoming shift into a new activity (Turner, 1999; Filipi & Wales, 2003). Although responses to the 'what-would-you-have-done' question varied, most responses involved callers describing a hypothetical delay in seeking medical treatment (as in Extract 13). All responses to the 'caller-consent' question involved provision of consent.

The caller survey questions constituted the final activity before closing, in all calls in the corpus. The questions were commonly prefaced with closing projections that indicated the impending end of the call. This feature can be seen in Extract 14, where the call-taker prefaces the 'caller-consent' question with "May I ask you a question before you g:o" (line 1). The design of this 'pre-question' (Schegloff, 2007) both projects call closure as upcoming, and postpones it to enable asking the projected question.

3.8 Closing

The act of closings in physically co-present medical encounters is known to require complex interactional work from all parties, including physical activities (like sitting, standing, etc.) and the possibility that patients will attempt to initiate additional medical talk (i.e., 'door-handle' remarks, Byrne & Long, 1976; Robinson, 2001). In contrast, closing on *Healthdirect* was typically achieved straightforwardly in a few short turns. Closing often involved a combination of optimistic projections about future health, exchange of appreciation, and a terminal sequence implemented through a farewell exchange. Extract 16 demonstrates the pattern of the majority of closings in the corpus. Prior to closing, the call-taker had provided home-based recommendations for the caller, who had contacted the service with concerns about his young daughter's finger pain.

Extract 15: Call 11

```
1 → Call-Taker:  Oh:kay well look I hope your daughter's finger gets
2                better if she can at lea:st sleep with it not so s:ore
3                (0.4)
4    Caller:     Alright
5 → Call-Taker:  =Oh- okay and um: thank you for your call
6    Caller:     Thank you so much
7 → Call-Taker:  Thank you: (.) goodnight
8    Caller:     Goodbye
```

Here, the call closing involves: an optimistic projection regarding the caller's daughter and her injured finger (lines 1-2), an appreciation (line 5), and a terminal exchange sequence (lines 7-8). By participating in this exchange, both caller and call-taker acknowledge that no further talk will take place, making the actual closing of the call the next relevant activity (Jefferson, 1988).

4. Discussion

Although some effort has been made to explore helplines (Shaw & Kitzinger, 2007; Feo & LeCouteur, 2013; Leydon, Ekberg, Kelly & Drew, 2013; Danby & Emmison, 2014), a substantial gap in understanding exists regarding the overall structure of these services. Contributions from the present study address this gap in knowledge by identifying distinct phases that callers and call-takers orient to throughout calls, and highlighting challenges that participants face in the negotiation

of these phases. Together, these findings provide useful information about the overall structure of health helpline services, and extend knowledge regarding how healthcare is delivered at a distance.

One feature of the health helpline overall structure examined here was the inclusion of mandated administrative tasks in calls. Call-takers were required to interweave medical activities with mandated tasks, and this resulted in repeated transitions into and out of health-related talk. These transitions were often managed by turn designs that acknowledged the mandated nature of the upcoming sequence (e.g., prefacing administrative turns with, "I just need to ask…", etc.). Patients progressively become acquainted with the format of health encounters through repeated exposure to healthcare services (Roberts, Sarangi & Moss, 2004). Given that physically co-present medical encounters routinely involve administrative tasks that patients undertake with clerical staff prior to consulting a clinician, the interweaving of medical and administrative tasks during *Healthdirect* calls may be unexpected by callers, and thus result in some interactional trouble. Misalignment of caller expectations and service requirements may explain why interactional trouble occasionally manifested during the confidential file phase, given that callers may not expect to divulge personal information at this point in the encounter. The way in which call-takers routinely transitioned into administrative phases by highlighting the mandated nature of the forthcoming task using prefacing was one way in which they managed the potential for misalignment around administrative tasks.

The inclusion of administrative tasks during calls results from the absence of initial call-handling in the *Healthdirect* system. Previous exploration of a triage-focussed health helpline has described an overall structure that is similar to primary care consultations (Pooler, 2010), rather than displaying the additional administrative call phases of *Healthdirect*. This difference in structure is due to the inclusion of front-line call-handlers on *NHS Direct* who perform administrative tasks before discussion with a medical professional takes place. It is this form of front-line administration that is likely to account for previous findings that health helplines share broad organisational features that are comparable to primary care consultations.

Healthdirect call openings and closings also displayed some differences from what has been found in their physically co-present counterparts. Generally, these phases unfolded in a straightforward manner, mirroring service call opening and closing (e.g., skipping the HAY sequence) rather than physically co-present primary care opening and closing (which is reportedly complex; Byrne & Long, 1976; Watkin & Zimmerman, 1999; Heritage & Robinson, 2006b). The streamlined opening and closing sequences observed in *Healthdirect* calls allow for rapid initiation and termination of an exchange – something that is necessary in a health helpline environment where call-takers do not have physical access to the patient, and therefore must move through calls quickly to assess safety. Additionally, this difference could be due to *Healthdirect* callers' transient relationship with the service. It is unlikely that callers will encounter the same call-taker more than once, which stands in contrast to patients who physically attend primary care services, where they are more likely to have long-standing relationships with health professionals. Therefore, physically co-present clinician-patient openings and closings may exhibit conversational practices that are more reflective of mundane talk (e.g., HAY sequence; Sacks, 1992) due already having established, or being in pursuit of, a long-term working relationship (Byrne & Long, 1976).

In *Healthdirect* calls, medical information-gathering activities were accomplished verbally, without touch, to suit the telephone-mediated environment. This pattern was particularly noticeable during physical examination sequences. In order to collect physical information, call-takers had to instruct callers verbally on how to perform certain self-tests that, in a physically co-present environment, would usually be performed by a health professional. This meant that callers were required to take on an active role in the assessment process, contrasting with the rather passive role that is usually expected of patients in physically co-present physical examination sequences (Byrne & Long, 1976). This feature of calls is examined in more detail in future research (current authors, forthcoming).

Another important feature identified in the present study involves the limitation on offering diagnoses for *Healthdirect* call-takers. To overcome this limitation, call-takers routinely packaged health advice as a suggested course of action, thus allowing callers access to expert opinion on how to manage their health concerns without the delivery of an actual diagnosis. In calls where call-takers bypassed the institutional restriction on providing diagnoses, 'sounds like'- formulated inferences were used to convey possible diagnoses regarding low-risk health concerns. Although these types of diagnoses are not part of the *Healthdirect* mandate, they served to facilitate the provision of low-level care advice (e.g., home-based care). This finding suggests that attenuated diagnoses (in the form of 'sounds like' formulations) may be of use in managing misalignments between call-takers and callers around the level of care required in response to a health concern. The service being provided on *Healthdirect* calls thus differs from what is known about physically co-present primary care consultations where a diagnosis would be expected by the patient as a key aspect of the encounter (Byrne & Long, 1976; Raymond, 2003).

The analysis reported here identified a number of important differences between physically co-present primary care consultations and health helpline calls. It is important for researchers, policy makers, and practitioners to be clear about the nature of these differences. The present study enables different stakeholders to identify where and how these differences are likely to impact the interaction. The differences identified in the present study can be separated into two categories: those that are intrinsic to telephonic interactions (i.e., a result of gathering all medical information verbally), and those that have been engineered through the design of the service (e.g., the requirement to create a confidential patient file at the outset of the conversation). Identifying and understanding these intrinsic and engineered differences enables health helpline system designers to reflect upon the interactional consequences of certain design choices, and identify areas where system changes could be implemented for enhanced service delivery.

Notwithstanding the identified differences between health helpline calls and primary care interactions, similarities were evident. These included the ways in which callers tended to frame their health problems (i.e., as 'known', routine or recurrent problems as compared to 'unknown' problems) and the occurrence of similar identifiable medical phases (e.g., verbal aspects of the medical information-gathering phase is similar to Byrne & Long's "examination" phase). These similarities are likely to result from the programmed CDSS structure mirroring the medical model of diagnosis discovery, a framework that underpins the organisation of most Western healthcare encounters (Swash, 1989). Callers' previous experience of physically co-present health services could also account for occasional displays of difficulty, on part of callers, in completing tasks not typically required in traditional medical encounters (e.g., the confidential file activity)(Roberts, Sarangi & Moss, 2004).

Investigating naturally occurring data has advantages over retrospective self-report accounts (such as surveys and interviews), as it allows for exploration of the moment-by-moment delivery of health services (O'Reilly, Karim, Stafford & Hutchby, 2014). The present study bridges a gap in knowledge regarding the overall structure of health helplines, which is necessary to understanding the social production and utility of such services. Here, we have outlined the structural organisation of health helpline calls and described how activities are negotiated within these calls, including how call-takers transition into and out of mandated administrative and medical tasks during calls. Findings from this study can be used for service training to educate call-takers on the complex nature of delivering healthcare at a distance. For example, in services such as *Healthdirect* where there are no front-line call-takers to collect administrative information from callers before triaging them to a nurse call-taker, training call-takers to manage transitions into and out of administrative tasks may assist smooth progress of calls, while preserving the economic benefit of not having to employ additional staff. Callers may also benefit from dissemination of information from the analysis presented here, as aligning health consumers' expectations with what services are able to

provide (e.g., diagnosis versus treatment recommendations) is important for ensuring satisfaction and continued use. Identifying how healthcare is managed at a distance using heath helplines opens avenues for future research exploring specific call features. Future research might consider how particular medical activities are achieved at a distance (e.g., diagnosis, where permitted), as well as exploring the overall structure of other formats of telehealth service.

5. Conclusions

Health helpline calls are highly structured medical encounters, displaying similarities to what is known about physically co-present primary care encounters, but also important differences. Although some of the differences between physically co-present primary care and health helplines are intrinsic to telephonic interaction, some are the consequence of system design. By identifying and understanding these differences through close examination of actual interaction, areas that may benefit from re-design or informed call-taker training become evident. Improving communicative practices to facilitate smooth progression of calls could enhance consumer satisfaction with health helplines, thereby leading to continued use and, potentially, increased uptake of telehealth services.

AUTHOR CONTRIBUTIONS

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance in the *International Journal of Medical Informatics*.

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Category 1

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Category 3

Approval of the version of the manuscript to be published: Stefanie Lopriore; Amanda LeCouteur; Stuart Ekberg; Katie Ekberg.

Conflict of Interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome. We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author and which has been configured to accept email from.

Summary points:

What was already known?

- Health helplines are becoming more popular for fast, free and cost-effective access to medical information and advice.
- Limited research exists that has explored health helpline overall structure and communication.
- The extent to which health helpline services differ to physically co-present (face-to-face) services remains unclear.

What has this study added to our knowledge?

- *Healthdirect Australia* calls are highly structured, involving 8 distinct phases: call opening, establishment of reason-for-calling, check of caller safety, creation of a confidential patient file, medical information-gathering, health advice, caller survey questions, and call closing.
- There are differences between how health helplines and physically co-present primary care encounters unfold.
- Some differences are intrinsic to telephonic interactions, whereas others are engineered through the design of the service.
- Identifying intrinsic and engineered differences enables system designers to identify areas where changes could be implemented for enhanced service delivery.

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Appendix 1

Transcription Notation

The transcription symbols listed are based on Jefferson's system of transcription routinely used in conversation analytic research (Jefferson, 2004).

(0.3)	The number in brackets indicates a silence measured to the nearest tenth of a second.
(.)	A full stop within parentheses indicates silence that is less than two-tenths of a second.
=	The equals sign indicates latching between utterances. This is used to indicate talk that is produced with no silence between the end of one speaker's talk and the beginning of the next speaker's talk.
[ ]	Square brackets indicate the onset and offset of overlapping speech.
>word<	Speech enclosed in inverted arrowheads represents speech that is noticeably faster than surrounding speech.
<word>	Speech enclosed in protruding arrowheads represent speech that is noticeably slower compared to surrounding speech,
.hh	A full stop before 'h' represents inhalation. The more hs afters the dot represents extended inhalation.
hh	A 'h' without a full stop represents exhalation. The more hs represents extended exhalation.
wor:d	A colon following a syllable or word indicates that the speaker has extended the syllable. More colons indicate longer extensions of the syllable or word.
,	A comma indicates slightly rising intonation.
.	A full stop indicates falling intonation.
?	A question mark indicates strong rising intonation.

¿	An inverted question mark indicates a rising intonation that is more strong that a comma, but less than a regular question mark.
<	A 'less than' symbol by itself is a left push. This indicates speech that sounds like it has been produced earlier than it is (also called a 'jump-start').
!	An exclamation mark indicates speech that is delivered in a lively or emphatic tone.
*word	An asterisk indicates a croaky delivery of the following speech.
ºwordº	Speech enclosed in degree symbols indicates that the speech is lower in volume than its surrounding speech.
word	Words or syllables that are underlined indicates emphasised speech delivery.
↑	An upwards pointing arrow indicates a rising shift in the speaker's intonation of speech.
↓	A downwards pointing arrow indicates a falling shift in the speaker's intonation of speech.
wor-	Words or syllables followed by a dash indicates an abrupt termination of speech.
WORD	Words in capitals mark a section of speech that is noticeably louder than its surrounding speech.
→	Arrows in the left margin of a transcript extract points to specific parts of the extract that are discussed in the analysis.
(guess)	A word enclosed in a bracket represents the researcher's best guess of the speaker's utterance.

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